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ABSTRACT

This competency-based preservice home economics teacher education module on applications and implications of new technology in textiles and clothing is the fourth in a set of four modules on consumer education related to textiles and clothing. (This set is part of a larger series of sixty-seven modules on the Management Approach to Teaching Consumer and Homemaking Education [MATCHE]--see CE 019 901-967.) Following the module objectives and overview, two units of instruction are presented on technological innovations and their applications. Each unit includes the unit objectives and overview. Each lesson includes a narrative summary and suggested activities, and the lesson for unit 2 provides a list of suggested resources (readings). A module pre/posttest (with answer key) concludes the document. (Workshop proceedings relating to the development of these modules are available in the ERIC system as CE 019 896-899; also available is a module on utilizing FHA-HERO as an instructional strategy to expand and strengthen the home economics instructional programs [CE 019 900].) (JH)

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CONSUMER APPROACH STRAND:

TEXTILES AND CLOTHING

# MODULE I-D-4 APPLICATIONS AND IMPLICATIONS OF NEW TECHNOLOGY IN TEXTILES AND CLOTHING

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1978

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CE 019 919

MATCHE

Management Approach to Teaching Consumer and Homemaking Education

MATCHE is an individualized, competency-based preservice curriculum designed for home economics education students at the preprofessional, upper division level. MATCHE is a comprehensive curriculum based on selected objectives which give emphases in three areas: 1) consumer approach to homemaking education, 2) teaching home economics in economically depressed areas, and 3) establishing occupational programs related to home economics. The material for each subject matter area of home economics has been organized into these three strands, and includes an FHA-HERO emphasis. These subject matter areas are home economics education core, housing, foods and nutrition, textiles and clothing, human development, and management.

The MATCHE modules were written by subject matter specialists from various colleges and universities offering home economics and therefore each is unique in the approach used for the development of the objectives. The modules allow for differences in level of achievement, rate of learning, and learning goals. They may be used independently, combined into a sequential series, or as a random set of conceptual units. Any instructor using the material can easily adapt the material to a specific group of students, the locale, method of instruction, and available facilities. Learning may be facilitated by offering one module in conjunction with others.

As MATCHE is continuously up-dated by those using the curriculum, some concepts and objectives may be added and others deleted. The purpose is to continually strengthen the program for pre and inservice home economics teachers.

Guidelines for Use and Continuous Development of MATCHE are on file with Home Economics units in each of the fifty state departments of education plus all of the Home Economics Departments in California institutions offering home economics education. This booklet and proceedings from the four MATCHE workshops give background information concerning the purpose and development of the MATCHE project.

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MATCHE PROJECT

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# APPLICATIONS AND IMPLICATIONS OF NEW TECHNOLOGY IN TEXTILES AND CLOTHING

## Module Objectives

The MATCHE student will be able to list and accurately describe five new technological applications which affect the clothing and textile industries (e.g., ultrasonic sewing machines, laser beams, computers, textile dyes, textile finishing chemicals, looms, welding techniques, knitting developments).

Given a list of current technological innovations within the textiles and clothing industries, the MATCHE student will be able to discuss the implications of each for textiles and clothing industries and society.

## Module Overview

Our society is changing at an ever accelerating rate due to technological developments. Some of the current technological innovations are already making an impact on the clothing and textile industries and on the ultimate consumers. Other current technological innovations are in the experimental stage but there is current discussion among the industries regarding the incorporation of these developments into the industries, and acceptance of these changes by consumers, and the future use of innovations in the home.

It is important, therefore, for you to know something about these new technological advancements and their affect on: employment, methods of production, environment (ecology), the quality and durability of products, product cost, and consumer acceptance of products. Of further importance is the realization and recognition that what seems new, mind expanding, and impossible today will be commonplace in the future. Other technological innovations will probably be developed in the future that will replace the new of today.

To aid in developing an understanding of these technological innovations, this module is divided into two units:

Unit 1: Technological Innovations and Their Applications

Unit 2: Technological Innovations and Their Implications

UNIT 1

TECHNOLOGICAL INNOVATIONS AND THEIR APPLICATIONS

Objectives

The MATCHE student will be able to list five technological innovations in the textile and clothing industries.

The MATCHE student will be able to describe and evaluate the use(s) of the innovative devices or methods in the textiles and clothing industries.

The MATCHE student will be able to describe any advantages and/or disadvantages to using the innovative devices in the textile and clothing industries.

Overview

In the textile and clothing industries, new changes are constantly taking place. This unit identifies several new technological innovations and modifications or expansions of existing technology in the textile and clothing industries. The unit encourages evaluation of the effectiveness of these innovations and/or modifications as to the overall advantages and/or disadvantages they might create.

Lesson: Technological Innovations and Their Applications

Narrative Summary

The textile and clothing industries are much the same as other chemical and business industries. There is constant change that results from changes in raw materials, supplies--fiber, yarn, fabric, processing and finishing operations, color-dyestuffs--and their application, final finishing, and product production. These changes may occur as a result of changes by the industries themselves (that is, the textile and clothing industries), or changes may occur as a result of the introduction of a new product or process having a much wider application that finds use in the textile and clothing industries.

Change may be attributed to several factors, but hopefully, one factor is the desire of the company to develop products that are more desirable to consumers than existing items. Many corporations make new products that provide better service and better quality to the consumer. Some corporations, unfortunately, want to find a new product that will sell rapidly and make money; they do not care if it provides satisfaction or has any merit at all. While there are fewer of the latter, the consumer should recognize that not everything new is better than our older models. Other reasons for new technological innovations involve such factors as: identifying ways to reduce product cost without a decrease in quality; identifying products with good safety characteristics; finding ways to cut labor costs without any reduction in production or quality; identifying manufacturing processes and products that conserve the nation's and the world's resources and reduce pollution of the environment.

Identifying and describing technological innovations involves a study of the current literature. Furthermore, what is new now will not be in a year or two. Thus the student must recognize that studying technological change requires studying current trade newspapers, technical journals, and technical bulletins. The items identified in this module are innovations and changes of the past several years. Probably there will be many new things in the next year or two. Thus students and their instructors will find items to list and discuss that differ from those cited here.

Furthermore, students should recognize that it takes time to take an innovation or new idea from the human brain or even from the human "sketch book" through the various stages of development to the ultimate user. So innovations now available to consumers are the product of research completed several years ago.

To identify various technological innovations requires the student to use, as stated before, the current printed resources or to locate letters or have actual discussions with individuals in research and development. As the latter is not usually possible, the best resources remain the current printed word.

Some of the innovations that have recently been introduced in the textile industries include such products and processes as:

a. The development of weaving frames that do not require shuttles. These shuttleless looms weave more rapidly than shuttle types with efficiency and produce good quality products. They generally reduce noise pollution.

b. The development of new methods to make yarn, such as open-end or break spinning, twistless yarns, self-twist yarns, and tape yarns. These processes produce good quality yarns at rapid speeds using less space, less energy, and less labor.

c. The introduction of new and improved dyes and methods of application of dyes to fabrics either in printed patterns or in solid colors.

d. The development and use of new finishing chemicals to produce textile fabrics that are safer, yet give the consumer desirable appearance, easy maintenance, and durability.

Some of the innovations that apply to the clothing industries include:

a. The development of sophisticated equipment to cut and join apparel parts in reduced time, with accuracy and durability.

b. The development of processes that pre-form sections for shaped apparel.

c. The development of mechanized systems for pattern duplication.

Some innovations have application in both textile and clothing industries. These include the use of laser beams and computers.

Unlike many aspects of textiles and clothing, the identification and evaluation of technological implications requires the constant review of all current resources and the ability to project new general developments into the confines of textiles and clothing. Many technological finds such as the laser beam were not developed for textiles and clothing, but some enterprising people saw the possibility of using the laser beam to cut fabric and to inspect fabric.

It is important to acknowledge that technological innovations are good as long as they: produce quality products at competitive prices; reduce, or at least do not increase, the consumption of limited natural resources, including energy; reduce pollution--air, water, noise, etc.; produce products that are as safe as or safer than older models, styles, and types.

Technological innovations must be questioned when: they adversely affect the economy, either through major employment changes or through production costs; they increase pollution levels; they increase the consumption of energy either directly or indirectly as a part of manufacture or maintenance; they eliminate other good products that might be needed for selected uses by individuals with limited incomes.

All activities should be submitted to and discussed with your instructor.

Suggested Activities

1. Study current periodicals and trade newspapers and identify at least five examples of equipment and new processes that are examples of, that use, or that are the result of technological innovations of the past few years.

2. Determine the segment of the textile and clothing industries that use or could use each of the innovations identified in #1.

3. Study current technical journals and identify at least five innovations in the textile and clothing industry.

4. Describe at least five innovations; evaluate the use of each of the innovations and identify advantages and/or disadvantages associated with each.

5. Prepare a swatch chart illustrating innovative new products.

6. Identify at least five innovative non-apparel uses of textiles and illustrate.

7. Identify and illustrate at least three non-traditional uses of textiles.

NOTE: In addition to current journals and papers, current textbooks may have some helpful information.

There is no progress check for this unit. When you think you have adequately covered the material upon completion of the activities, proceed to Unit 2.

UNIT 2

TECHNOLOGICAL INNOVATIONS AND THEIR IMPLICATIONS

Objectives

The MATCHE student will be able to list the implications which the uses of ultrasonic sewing machines, laser beams, and computers have in relation to the textile and clothing industries and the consumer dollar.

The MATCHE student will be able to list the implications which the uses of innovative textile dyes and textile finishing chemicals have for the textile and clothing industries and the consumer dollar.

The MATCHE student will be able to list the implications which the uses of innovative looms and knitting developments and welding techniques have for the textile and clothing industries and the consumer dollar.

The MATCHE student will project the implications of the above technological innovations for the consumer and the textile and clothing dollar and will forecast the results of these implications in view of projected trends.

Overview

New technological innovations are being developed rapidly in the textile and clothing industries. It is extremely important to be aware of not only the innovations, but also their implications. This unit suggests current technological innovations in the textile and clothing industries with which the student should be familiar. It is your responsibility to formulate an educated opinion regarding ways in which the innovations will have an impact on society.

Lesson: Technological Innovations and Their Implications

Narrative Summary

The implications that technological developments and innovations have on the textile and clothing industry are, in general, much the same as those of any new development on any business and industry. The implications are far wider in scope than just the industry. People, the environment and ecological concerns, the consumer dollar, as well as the industries' or businesses' profits and losses, are all affected to some degree.

Some of the basic effects of technology include: (1) increased production; (2) better quality production; (3) reduced labor manhours with concomitant reduction in the size of the labor force; (4) rapid style changes with minimum time involved; (5) greater variety of styles, designs, and products; (6) changes in patterns of use, misuse, and savings of raw materials, natural resources, and energy.

Consumers should give some real thought as to whether they want continued growth in the number of products, in the speed of style changes, and in the number of new products, or whether they would prefer conservation of resources and reduction of the pollution of the environment. It is doubtful if the consumer can have both. More and more products mean fewer and fewer resources and more and more pollution. Technological efforts might be directed toward finding ways to reduce pollution and the continued wanton use of natural resources while still providing consumers with desirable, durable, varied products.

In order to provide input into the future use of technological innovations, as well as to identify the direction they feel these innovations should take, home economists need to become active politically and to have some understanding of economics, sociology, psychology, business, and politics.

To be well informed about innovation, both the positive and negative sides, one must read current publications--not just in the area of textiles and clothing but also in sociology, political science, and economics.

Because a major aim of home economics is the improvement of home and family life, it is important that future home economists, and through them all consumers, be made aware of interrelationships among factors of change. With this awareness goes a knowledge of what data are needed to evaluate whether innovations are good or bad for the future family.

Suggested Activities

1. Talk with at least three administrators or supervisors in various facets of the textile and clothing industry and obtain their ideas about the impact of various new technological developments on business and on society in general.

2. Locate at least three articles that provide insight into the impact of technological innovations in textiles and clothing on the family unit and on various life styles.

3. Identify at least three pros and cons regarding the development of new end-use items in textiles and clothing.

4. Talk with at least ten consumers to obtain their opinions regarding what they consider to be desirable new products and what they would like to see. Evaluate these in terms of their impact on the national economy.

5. Select two of the following technological innovations and identify data that help determine the relative merits of the development.

   The two should be selected from: ultrasonic sewing machines, laser beams, computers, new textile dyes, new textile finishing chemicals, new looms, new knitting machines, and welding, fusing and melding techniques.

   Some questions to ask yourself in doing your evaluation are:

   a. What are the economic advantages or disadvantages?

   b. Is the innovation going to reduce cost to the consumer but maintain or improve product quality?

   c. What impact does the innovation have on the conservation, use or misuse, of natural resources?

   d. How is pollution affected?

   e. What impact will the innovation have on the labor force?

   f. Will product variety be increased, and if so, is this increase beneficial to consumers?

There is no progress check for this unit. When you think you have adequately covered the material upon completion of the activities, proceed to the posttest.

As a part of the posttest, evaluate material obtained as a part of the activities as well as the test questions. Have the work evaluated by your instructor.

## Suggested Resources

Because of the contemporary nature of this topic, current issues of journals and other periodicals should be consulted, including the following:

American Dyestuff Reporter
American Fabrics
CIBA Review
Modern Textile Magazine
Textile Chemist and Colorist
Textile Research Journal
Textiles
Textile Technology Digest
Wall Street Journal
Women's Wear Daily

Textile Organon

Daily News Record

Textile Month

America's Textile Reporter/Bulletin

Textile World

Textile Industries

Knitting Times

Current textbooks might provide good background information:

Joseph, Marjory L. Introductory Textile Science. 3d edition. New York: Holt, Rinehart, and Winston, 1977.

Lyle, Dorothy. Modern Textiles. New York: John Wiley and Sons, 1976.

Slides

Textiles: A Visual Experience. 6 Sequences. Slides and Script. Spring Mills, Inc., 1973-74.

MODULE PRE/POSTTEST

Applications and Implications of
New Technology in Textiles and Clothing

Student_____

Instructor_____

Date_____

Student: This pre/posttest will assess your knowledge of the information presented in this module. You need study only those units that are prescribed on the basis of the pretest results.

1. Identify at least five new technological innovations in the textiles and clothing industries:

   a.

   b.

   c.

   d.

   e.

2. In which segment of the textile and clothing industry does each of the innovations listed in #1 belong? (i.e., weaving, clothing, construction, etc.)

   a.

   b.

   c.

   d.

   e.

Pre/posttest (continued)

3. Select five innovations (you may use those cited in #1, or identify others) and:

   a. Describe each and discuss advantages and/or disadvantages to their use.

   b. Evaluate the use of each in terms of its impact on the textile and clothing industries.

      1.

      2.

      3.

      4.

      5.

4. List at least two implications that each of the following has or will have on the textile and clothing industries and how it will influence the consumer dollar.

   a. ultrasonic sewing machines

      1.

      2.

Pre/posttest (continued)

b. laser beams

1.

2.

c. computers

1.

2.

d. new textile dyes

1.

2.

e. new textile finishing chemicals

1.

2.

f. new looms

1.

2.

g. new knitting machines

1.

2.

h. welding, fusing, melding techniques

1.

2.

5. What impact will these various innovations have on future developments in the textile and clothing industries and how might these affect the consumer and the consumer dollar?

Return this test to your instructor for evaluation.

ANSWER KEY
MODULE PRE/POSTTEST

Applications and Implications of
New Technology in Textiles and Clothing

Instructor: Do not reproduce this page in students' booklets. You must retain it for grading and prescriptive purposes. Answers will vary with individuals. A preferred response might be similar to the answer presented.

1. The following list of innovations is not complete but it should provide the leading examples that might be cited. Other items not appearing on this list can be verified by checking with the instructor.

   a. open end spinning frames
   b. shuttleless looms: rapier, gripper, air jet, water jet
   c. computerized knitting frames
   d. laser beam inspection frames
   e. electron radiation for textile finishing
   f. rotary screen printers--horizontal, vertical
   g. transfer printing processes
   h. modified fibers and new fibers for specialized use
   i. new textile finishing chemicals
   j. new textile dyes
   k. special texturing processes
   l. textile composites and laminates
   m. polychromatic printing (chromotronic, etc.)
   n. stitch-bond fabrics
   o. non-traditional yarn manufacture such as tape yarns, twistless yarns, selfil yarns
   p. laser beam cutting units
   q. ultrasonic sewing machines
   r. molded apparel and fabrics
   s. high frequency welding and fusing equipment
   t. pattern duplicators--automatic
   u. computerized inventories
   v. miscellaneous computer use

2. Areas of the industry in which innovations will be found. Again, if items have been listed that do not appear on list #1, then verify response with the instructor.

   a. open-end spinning, yarn manufacturing
   b. shuttleless looms, fabric construction-weaving
   c. computerized knitting frames; knitting complex jacquard knits and other highly patterned knit fabrics
   d. laser beam inspection, fabric construction-inspection operation

e. electron radiation, textile finishing such as curing resin finishes
f. rotary screen printers, printing of fabrics
g. transfer printers, printing of fabric and finished apparel
h. modified fibers and new fibers, for use in ultimate fabrics
i. new textile finishing chemicals, processing of fabrics into final form for consumer use
j. new textile dyes, for coloring and printing fabrics
k. special texturing processes, yarn manufacturing
l. textile composites and laminates, fabric manufacture
m. polychromatic printing (chromotronic, etc.), printing of fabrics, particularly deep pile fabrics and carpets
n. stitch-bond fabrics, fabric construction
o. non-traditional yarn manufacturing, yarn manufacturing operation
p. laser beam cutting units apparel manufacturing
q. ultrasonic sewing machines, product manfacture-apparel and home furnishings
r. molded apparel and fabrics, apparel manufacture and home furnishings
s. high frequency welding and fusing, product production--both apparel and home furnishings and industrial products
t. pattern duplicators, automatic, apparel manufacture
u. computerized inventories, manufacturing, wholesale, retailers (all businesses where stocks are maintained)
v. other computer uses: bookkeeping, payrolls, pricing, etc., computerized pattern layout in apparel manufacture, etc.

3. For each of the innovations listed in #1, discussion of the process, its advantages and/or disadvantages is cited briefly. Discuss answers with instructors for additional details.

a. Open End Spinning Frames:

These units take the card sliver and convert it directly to yarn without the intermediate drawing and roving steps. Open end spinning produces yarns more rapidly than do older methods, with less manpower required. Space requirements per unit are greatly reduced; consequently, floor area needed is reduced and overhead costs may be reduced. Yarns are fairly uniform and can be used extremely satisfactorily in the filling of woven fabrics and for some fabrics for both warp and filling. These yarns are not as strong as traditionally spun yarns; thus use in warp where strength is needed is discouraged as yet. Open end yarns tend to be slightly coarse and somewhat irregular; they are not recommended for smooth and/or sheer fabrics. While there are several different units in operation, the basic principle is the same: Some units actually convert fiber into yarn in continuous operation, but a sliver is usually an intermediate step in the process.

b. Shuttleless Looms:

These looms weave fabric without the use of shuttles. Filling picks are placed by a variety of devices or techniques. Grippers may catch the filling yarn and carry it across the sned; a rapier may take the yarn from the supply to the center where a rapier from the other side comes to the center, grasps the yarn, and carries it on across the shed. Jets of air or water can carry the filling pick across the loom shed in place of shuttles. Shuttleless looms operate much faster than shuttle looms. Manpower requirements may be slightly less than for shuttle looms. Fabrics produced on these looms are uniform in quality. The greater speed of operation and the uniformity combine to produce good quality fabrics at lower operating costs. The noise level for operation of these looms is less than for traditional units, thus reducing noise pollution somewhat. There is no apparent disadvantage to the use of these looms. It is anticipated that manufacturers will tend to replace old looms with shuttleless varieties as the old looms become too costly to repair and maintain.

c. Computerized Knitting Frames:

These knitting units have attached computers that control the needle action so that direction for simple to highly complex designs can be given to the knitting frame in a matter of minutes. New designs can be made quickly; thus a wide variety of patterns can be knitted in limited yardage. These units have great design flexibility. Fabric style and pattern changes can be made in minutes. These units can be used for highly patterned fabrics or for relatively simple knits. While labor must be skilled, the time required to develop pattern controls is usually less than for other patterning devices. Because of the design flexibility, fewer knitting units may be able to produce the style line of a manufacturer. This may conserve space and possibly energy. In general, computerized knitting is, as yet, limited to filling knits, primarily double knits. There are no obvious disadvantages, unless one considers that there might be a reduction in manhours of labor per yard of fabric knitted, which can reduce the number of people employed.

d. Laser Beam Inspection:

Laser beams are used to inspect fabric for flaws. When flaws are detected, the movement of fabric stops so that they can be marked and repaired when possible. The laser beam inspection provides consistent quality and high speed inspection. The beam identifies broken yarns, discoloration, knots; it can be set to note major skew (off grain). One unit can replace several perch inspection frames,

using one person per perch. Thus there is a reduction in floor space required and a reduction in the number of operators needed. The laser inspection can grade the flaw to determine: if it requires mending, if it needs to be discarded, if it must be identified as second quality, or if it can be marketed as is without affecting use in any way. Safety precautions must be adhered to for proper use of the laser beam inspection unit.

e. Ultrasonic Sewing Machines:

These machines use sonic waves and the heat created by their friction to seal fabric pieces together. A stitch-like effect may be imparted or the seal may be smooth and flat. Ultrasonic sewing machines join knitted, woven, and nonwoven fabric together. Fabrics must have at least 65 percent thermoplastic fiber such as nylon, polyester, modacrylics, or polypropylene. The operation cuts, joins, and seals edges. No thread is used and no needles are required. Units are available for making buttonholes. While these units are costly, they save money in notions and needles. The major disdavantage is that they are not usable on natural fibers or nonthermoplastic man-made fiber fabrics. They are not as resistant to pull as regular stitching.

f. Molded Apparel and Fabrics:

Fabrics utilizing thermoplastic fibers may be shaped and set. These molded items include bra cups, entire bras, fabrics for acoustical use in home and home furnishings, and fabrics for special insulative use. The shape is permanent to recommended care procedures and to suggested end-use applications. The process is limited to fabrics with 50 percent or more (65 percent is better) thermoplastic fibers in the fabrics involved. Knitted, woven, and nonwoven fabrics may be molded. Entire apparel items may be molded, thus eliminating all the normal construction operations. Experimental dresses have been molded, as well as men's pants. The process is rapid and shape is maintained during recommended care. Cost may be reduced due to reduced processing steps in end-use production. Alterations are difficult if not impossible, flexibility may be somewhat limited, and storage space needed is increased.

g. Electron Radiation:

Electron and gamma ray irradiation are used in finishing resin chemicals on textiles. These replace high temperature ovens. The use of electron radiation has demonstrated noticeable savings in amount of finish required and, in some instances, saving in energy costs. The process can be used in curing durable press resins, setting flocked finishes, and selected other processing, including

application of soil release finishes and improvement of wicking properties. It requires special facilities and is not economical for low production. Skilled labor is required for operation of this equipment.

h. Automatic Pattern Duplicators:

These units produce multiple copies of patterns automatically on any type of paper and nonwoven fabrics. Patterns are duplicated rapidly and accurately on regular white paper, pattern paper, nonwoven pattern fabrics, or other papers. The process is dry; each pattern is as accurate as the original. There is a saving of labor and an increased reliability as size remains constant. These copiers are easy to use.

i. Computerized Inventories:

Computer terminals at various locations make it possible to maintain up-to-date inventories at all times. Any level of the textile and clothing industry will find computerized inventory systems advantageous. These systems maintain up-to-date records on all items in storage, on orders and reorders, daily sales by style and item, etc. The computer may be programmed to indicate other data, such as the location of stored merchandise and projected needs based on sales, orders, and reorders. These systems promote economics in that production can be controlled to identify needs better than older record keeping methods. Retail stores using such systems can reduce the amount of merchandise that must be marked down because of overstocking. These systems help in offering the product at a lower cost to consumers due to savings in manufacture, in stock, and in record keeping.

j. Other Computer Use:

Computers can direct, record, and print all types of information and monitor action required in the industries. Computers offer accurate instruments for a wide variety of essential activities, such as: payroll records, accounting, purchasing, pattern drafting, pattern grading, pattern layout. In every instance, the records are accurate, the printout is consistent in quality, and time and labor costs are reduced. A disadvantage of the computer is that it seldom can offer any personal touch and may continue to promote an error once it occurs.

k. Rotary Screen Printers

New screen printers print fabric just as old processes do. The difference is that modern screen printers can use rollers instead of flat screens and that process is automatic. For roller screen print, the dye is fed into the center of the roll and forced out of the design openings by a squeegee. Automatic screen printers are rapidly increasing in use. They are adaptable to large patterns; they can be used for relatively limited yardage when desired; they are available in very wide frames to print fabric over 100 inches in width; the actual width used is flexible through proper use of the design roll; they can be used with any dyestuff adaptable to printing and colors are easily changed. New units are available in a vertical format that can print both sides of the fabric simultaneously if desired. These units require considerable less floor space as well. New screen printers print faster than roller machines and older screen print frames. Design flexibility is greater than by any other technique other than hand painting. Fabric distortion is at a minimum. There is no major disadvantage except that the rollers used are fragile and can be damaged easily. They do not have as long a print life as metal rollers used in direct printing.

l. Transfer Printing (Sublistatic Printing)

Print designs are first printed onto special paper. The printed paper and fabric to be printed are then fed together through the transfer printer. The process of transfer, often called sublistatic, printing involves the transfer of color from a preprinted paper to the fabric. The dyes sublimate from one surface to the other or they are transferred by contact with a wet fabric. The process is rapid, it provides for a wide variety of designs, and it is durable when dyestuffs used are compatible with fabric used. Fabric distortion is kept to a minimum and flaws in printing can be held to zero if care is exercised. Very brilliant colors and very bold designs, as well as soft colors and simple patterns, can be printed by this process. Yardage printed at any one time can be limited to a short length, if desired. The use of this process on garment sections or on completed garments like T-shirts has been a current use and provides great individuality of styles and apparel items for consumers. The major disadvantage is that the process still poses some problem in printing natural fibers; however, there are indications that this will be solved in the near future. Other disadvantages include: two impressions are required--printing of the paper and transfer from paper to fabric--resulting in a process waste; transfer speed is limited; paper and dye residues on the paper remain as waste after transfer; sublimation property of printed textiles is problematic and depends on fiber content and surface textures; surface textures of textiles may be affected by

heat and the appearance of the fabric spoiled by the transfer process; it is difficult to obtain the deeper colors; application is limited to selected textile materials. Advantages of transfer printing include: reduction of wastewater and disposal costs; simple and clean operation, with low numbers of personnel required; high printing accuracy especially suitable for knitwear; lower fraction of defective merchandise; readiness to respond to order, thus reducing stock costs. Companies with no printing experience or other equipment can easily produce printed textiles using the transfer paper and simple equipment.

m. New and Modified Textile Fibers

There are always new versions of existing fibers as well as completely new fibers. These are created for specific characteristics. Some of the newer products include Qiana nylon, Kynol novoloid, Nomex and Kevlar aramids, SEF moda-acrylic, and ceramic fibers. Other modifications of fibers include those designed to be flame retardant, those with anti-static properties, and those with reduced pilling. Advantages of new and modified fibers include such factors as: providing safer products to the consumer; providing special features desired by consumers; providing ease of care; providing fibers for highly specialized end-uses. Disadvantages might include: consumers need more knowledge in order to make wise selections, and previous experience aids in providing this knowledge and information; new products are frequently more costly; and new products may use limited natural resources.

n. New Textile Finishing Compounds

New chemicals for finishing textiles appear yearly. These include chemicals for flame retardance, minimum care, fabric stabilization, anti-static, etc. The continuous development of new textile finishing chemicals and processes provide end-use of items that meet the consumers wants and, in selected cases, that meet government standards. These developments continue to provide fabrics with easy care characteristics, with flame retardancy, and with other properties such as soil release, water repellency, dimensional stability, and abrasion resistance. In addition, finishes can provide appearance characteristics including glazing, flocking, puckering, and polishing. Disadvantages are the same as they have been. Most finishing chemicals reduce fabric strength and many finishes eventually wear and/or wash away. Some finishes may cause allergenic reactions for sensitive customers.

Pre/posttest Answer Key (continued)

o. New Textile Dyes:

Dyestuff manufacturers are constantly developing new dyes. These products are developed for: better colorfastness on both old and new textile fibers, better colorfastness at lower cost, and wider color choices within various dye classes. Dyes for special effects such as those that are light or temperature sensitive are gradually being used. Such chameleon type dyes can cause color changes as the amount of light changes or as temperature changes. New dyes must be developed for each new fiber in order to provide colorfastness properties on that fiber. New dyes may be more expensive. They may require more sophisticated methods of application and thus highly skilled labor.

p. Special Texturizing Processes:

The development of texturizing processes, particularly for polyester, that make yarn handling and processing easier has increased the use of textured yarns. The quality of the yarns made by these special texturizing techniques is good. New texturizing processes provide for texturing as the filaments are drawn and combined into yarns. These permit greater flexibility in the introduction of texture. Quality of yarn appears to be improved.

q. Textile Composites and Laminates:

Great versatility of fabrics for specialized use is made possible by combining two or more of the wide variety of techniques for making fabrics. The combination of two or more fabrics into composites or laminates is one of these modern methods. Fabrics can be produced from two or more layers of woven, knitted, or nonwoven fabrics. These composites can be designed for very special use or they can be made for general applications in home furnishings and apparel. Composites and laminates--multicomponent fabrics--offer a wide variety of specialized products for end-use applications. These fabrics may require specific care techniques in order to prevent delamination, layer separation, or stiffening. Cost may be high.

r. Polychromatic Coloring (Chromotronic, TAK, etc.):

This general process invloves the feeding of color through jets either onto a feeder tray which, in turn, feeds the dye to the fabric or color is fed directly to the fabric. A variety of color arrangements can be created. The techniques provide for deep penetration of color particularly for deep pile structures such as carpeting. It is not possible to plan exact duplicate patterns but designs are repeated in a manner that gives an impression of design repeats. Dye liquors must be thin enough to penetrate the fabric

or fabric pile but not so thin that it will not attach adequately to the surface. Ultimate colorfastness depends on the type of dyestuff selected and the fibers being colored. The process is highly advantageous for printing carpets and provides a new design source.

s. Stitch-Bond Fabrics:

These fabric structures are made by combining yarns and/or layers of fibers by a stitching operation. Fabrics may resemble knitted structures, woven structures, pile fabrics, or nonwoven fabrics, depending on the layers, the size of yarns or fiber mats used, the size of the stitching thread, and the closeness of the stitching. These structures create a wide variety of fabric types. Cost of production is somewhat less than for weaving and may be similar to or slightly less than knitting and nonwoven processes. Care and maintenance is the same as for traditional fabrics.

t. Non-traditional Yarn Manufacturing Processes:

Yarns for certain uses may be made from tape (slit film) by joining fibers into a central thermoplastic core (bobtex), by tying fibers together (fasciated), etc. These methods of making yarn are all attempts to bypass the time consuming and costly steps involved in the traditional operations. They are effective for special types of yarns from special fibers, filaments, or films. They are good for selected end-uses but not for every use. Many of these are coarse, others are somewhat weak; thus they do not, as yet, replace the older yarn making processes.

u. High Frequency Welding or Fusing:

Sections of fabric in apparel or other end-use items may be joined by welding or fusing using high temperatures and some thermoplastic fibers. These operations join layers of fabric together. The joining can resemble a seam, or two pieces of fabric, such as the outer fabric and interlining for apparel, can be fused. The processes decrease time required in constructing apparel and home furnishing items. When properly done, there is no separation of layers. Care instructions should be adhered to. These processes reduce labor costs and, in some instances, may improve the product quality. They tend to detract from the "hand tailored" look desired by some consumers.

3. b. The following is a general answer to question 3b. Discuss alternatives and additional responses with your instructor.

In nearly every instance, these innovations reduce time required in production. Greater versatility in design and great flexibility as compared with older techniques are inherent in innovations. In some cases there is a reduction in manual labor and there is frequently a change in the type of labor needed--more highly skilled labor and less unskilled labor is a frequent consequence. Quality of products may be improved due to more accurate controls. In some cases, pollution is reduced as a result of changes in operation. In apparel and other end-use items, there is consistency in size and appearance of products. Computers enable all levels of the industry to maintain accurate records and current data on orders, inventories, returns, cost, profit and loss, etc.

4. List implications that each of the following have or will have on the textile and clothing industries and how it will influence the consumer dollar. The following answers are NOT comprehensive. Please discuss alternatives and additional answers with your instructor.

Ultrasonic Sewing Machines:

This is one type of welding operation.

a. Joining of fabrics either in cut pieces or layers to resemble stitching--an attempt to duplicate another process at lower cost.

b. Requires some thermoplastic fiber; thus petroleum or other energy source is used and consumers are using some of the limited natural resources.

c. Provides variety of designs to resemble quilting at very rapid speeds--again a duplication of a traditional process at lower cost.

d. Adds to the variety of construction techniques available at faster speeds.

e. No major difference in labor costs per machine as an operator is needed. However, employment may be affected by an increase in production speed per machine, thus reducing the number of machines and operators needed to meet the orders.

f. Energy costs are reduced as these machines normally require less power than traditional units.

g. Pinsonic units operate much faster with less "down" time than regular quilting units.

h. Maintenance costs are lower.

i. Noise levels are lower.

j. Unit finishes seam edges at the same time it stitches seam.

Laser Beams:

Some uses of laser beams in the textile and clothing industry include fabric inspection and cutting apparel. Implications include:

a. Laser beam units operate very rapidly with a high level of accuracy and with less skilled labor.

b. Laser cutting operates with no fabric distortion so that no change in size from one garment to another of the same pattern size occurs.

c. Because of rapidity and accuracy, laser-cut apparel can reach consumers in less than one-half the regular time required.

d. Skilled labor can be transferred to other positions or replacements will not be needed.

e. Reduced noise levels.

f. Energy costs remain similar.

g. Laser inspection units operate much faster than other systems, and more accurately. They can grade flaws systematically.

All of these implications mean higher quality merchandise at faster production rates, and thus lower costs to consumers.

Computers:

Computers are used in many facets of the textile and clothing industry. They maintain accounting and inventory records of all kinds; direct machines in the production of fabrics with special jacquard or complex patterns; arrange pattern layouts for cutting of apparel; and draft and grade patterns for apparel. Implications include:

a. Ability to maintain constant inventory records, which can reduce losses due to overstocking as well as reduce loss from delayed records.

b. All records are more accurate, reducing errors and saving money.

Pre/posttest Answer Key (continued)

c. In knitting, especially, computers create new designs quickly, making it possible to produce limited yardages economically and to change styles to meet consumer needs and desires without major cost.

d. In general, computers tend to reduce labor costs and cut time required for various operations.

e. Computers help to promote uniform quality as well as uniform record keeping devices.

All computer applications tend to reduce, ultimately, the cost to consumers for textile and clothing products. They reduce time and labor required for a variety of operations, which, obviously, reduces cost. The increased use of computers tends to decrease the level of personal interaction, which is disconcerting to some consumers.

New Textile Dyes:

Implications as a result of new dyes include:

a. The potential for a wider variety of color choices for all fibers is possible.

b. Dyes with improved colorfastness properties means better satisfied consumers and a longer product life, which reduces replacement costs.

c. New dyes increase the flexibility in methods of application, which, in turn, may reduce pollution and energy consumption.

New Textile Finishing Compounds:

Major implications in the development of finishing chemicals and processes include:

a. New chemicals for finishing provide safer products to consumers.

b. Selected new chemicals may reduce water pollution through solvent application rather than water bath application.

c. Selected new chemicals may reduce damage to textile structures, thus increasing durability of items.

d. A wider choice of chemicals for various finishing processes provides manufacturers and converters with the opportunity to use those that are best for the textile structure and provides a variety of quality levels.

e. In general, consumer costs may be reduced through less frequent replacement and easy care with maintained appearance. Original consumer costs may be less; but more often, product cost may increase due to higher costs for raw materials and for research costs involved in the product development.

f. Manufacturers must consider energy conservation, pollution of the air and water, noise pollution, health related factors in the use of these products, and their impact on natural resources.

g. Consumers should be informed concerning the finishes, care required, predicted durability, and any health hazards that might be associated, such as possible allergenic reactions.

New Looms:

These looms all produce fabrics of any width up to 120 inches or more and with varying degrees of complexity, depending on controls attached to the loom.

a. Shuttleless looms weave fabric faster than traditional shuttle type looms. This should reduce the ultimate consumer cost.

b. There tends to be fewer flaws as frequent joining of pick yarns is unnecessary. This will increase quality levels.

c. Noise levels are reduced in plants, as there is no constant knocking of a shuttle across the weaving shed. This reduces ear related health problems for operators.

d. Such looms form non-traditional selvege edges. However, in most end-use applications, this does not affect the consumer.

New Knitting Machines:

Implications include:

a. These units produce highly complex fabric with a minimum of operator time, thus reducing manufacturing costs and lowering consumer prices.

b. Limited yardage of designs can be produced on order, thus reducing inventories, reducing the hazard of unsold yardage, and still providing the consumer with a variety of products at a cost that is somewhat lower.

c. Computerized knitting units can change designs in a matter of minutes, thus providing designs on order with minimum time gap.

d. New knitting machines operate rapidly and produce fabric more swiftly than older machines. These units use less energy and other resources such as time. The consumer pays less per yard for overhead and labor.

Welding, Fusing, Melding Techniques:

These processes are additional methods of joining two or more layers of fabric together without the traditional sewing. Ultrasonic sewing, cited earlier, is one type of welding process.

Implications include:

a. All of these operations aid in providing sections of or complete end-use products at a lower cost and a faster production speed.

b. The product gives good appearance and good durability.

c. Costs to the consumer are reduced, generally, due to the reduction in time and labor required.

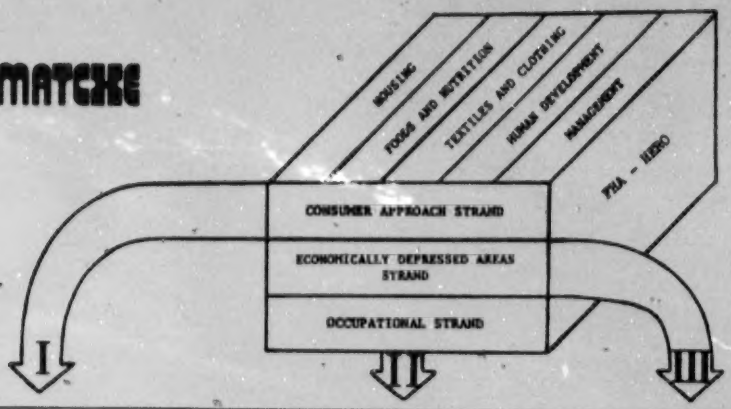
d. Quality of the products is satisfactory for selected end-uses.

e. For consumers who might want the appearance characteristic of high quality, hand tailored construction, these techniques are not usable. They are typical of mass produced operations and not individualized methods.

f. Other general implications of fusing and welding techniques are: reduction in need for skilled sewing machine operators; reduction in need for skilled hand sewing tailors; increase in production rate; increase in energy consumption (however, this increase may not be large, depending on the type of equipment that is replaced); a reduced amount of individualization; and increase or decrease in durability, depending on the product and the process.

5. Technological innovations will continue to be the result of research and development. These innovations will have many ramifications in the textile and clothing industries. For the most part, it might be anticipated that conscientious research will utilize the successful development of the 1960s and 1970s and look for new techniques to provide the ultimate consumer with items desired at reasonable prices. It is important to note that consumers today should evaluate products carefully and inform the proper authorities of products with little or no merit so that they can be discontinued. Further, consumers should be concerned about energy consumption, wasteful use of natural resources, and elimination of jobs. There needs to be recognition of changes in type of labor required and opportunities provided for re-education of those in the labor force. Developments that provide quality products in an optimal choice range should be encouraged providing they do not affect, negatively, the use of resources and the labor market.

# MATCHE




| | I | II | III |
|---|---|---|---|
| A. | CORE: CONSUMER APPROACH TO HOMEMAKING EDUCATION<br>1 Life Styles and the Consumer<br>2 Community Consumer Resources<br>3 Consumer Rights and Responsibilities<br>4 Incorporating the Consumer Approach in Homemaking Classes | CORE: ESTABLISHING OCCUPATIONAL PROGRAMS<br>1 Analyzing Job Market Opportunities<br>2 Developing Occupational Programs<br>3 Implementing Occupational Programs<br>4 Evaluating Occupational Programs | CORE: TEACHING HOME ECONOMICS IN ECONOMICALLY DEPRESSED AREAS<br>1 Characteristics of Economically Depressed Areas<br>2 Life Style Characteristics of Economically Depressed Areas<br>3 Community Resources for Economically Depressed Areas<br>4 Developing and Implementing Programs for Economically Depressed Areas |
| | AREA (Module) PACKAGES | AREA (Module) PACKAGES | AREA (Module) PACKAGES |
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| D. | TEXTILES AND CLOTHING<br>1 Consumer Approach to Textiles and Clothing<br>2 Sociological, Psychological, and Economic Factors Affecting Clothing Selection<br>3 Clothing Needs of Individuals<br>4 Applications and Implications of New Technology in Textiles and Clothing | TEXTILES AND CLOTHING<br>1 Occupational Opportunities Related Textiles and Clothing<br>2 Assembly Line Garment Construction<br>3 Merchandising Textiles and Ready-To-Wear | TEXTILES AND CLOTHING<br>1 Clothing the Individual and Family<br>2 Utilizing Resources for Clothing and Textiles |
| E. | HUMAN DEVELOPMENT<br>1 Societal Changes Affecting the Family<br>2 The Relationship Between Spending Patterns and Interpersonal Relationships<br>3 Financial Pressures in Various Life Styles and Cycles<br>4 Individuals and Families in Crisis<br>5 Consumper Aspects of Parenthood | HUMAN DEVELOPMENT<br>1 Occupational Opportunities Related to Human Development<br>2 Children's Center Aide<br>3 Developing Programs for Preschool Children<br>4 Convelescent Home Aide | HUMAN DEVELOPMENT<br>1 Characteristics of Economically Depressed Area Families<br>2 The Child and the Economically Depressed Area Family<br>3 Resources for the Economically Depressed Area Family |
| F. | MANAGEMENT<br>1 Relationship Between National and Consumer Economics<br>2 Consumer Legislative Issues<br>3 Environmental Issues and the Consumer<br>4 Financial Management<br>5 Family and Individual Credit Management<br>6 Management View of the Multiple Role<br>7 The Metric System | MANAGEMENT<br>1 Occupational Opportunities Related to Home Management and Supporting Services<br>2 Occupational Preparation for Jobs Utilizing Housekeeping Skills | MANAGEMENT<br>1 Management Skills<br>2 Money Management<br>3 Marketing Practices in Relation to Low Income Clientele |